BAKER DAM RESERVOIR

Introduction

Baker Dam Reservoir is a small impoundment on the Santa Clara River in extreme southwestern Utah. At the time of this writing (July 1993) it is leaking and may need to be drained. It is also known as Baker Reservoir.

Characteristics and Morphometry

Lake elevation (meters / feet)	1,484 / 4,869
Surface area (hectares / acres)	25.5 / 63
Watershed area (hectares / acres)	33,232 / 82,115
Volume (m^3 / acre-feet)	
capacity	1,850,253 / 1,500
conservation pool	none
Annual Inflow	not measured
Retention time (years)	<1
Drawdown (meters / feet)	not measured
Depth (meters/feet)	
maximum	16.7 / 55
mean	5.6 / 18.4
Length (meters / feet)	868.6 / 2,850
Width (maximum)(meters / feet)	274 / 900
Shoreline (km / miles)	1.67 / 1.04

The reservoir shoreline is owned partly by the BLM and partly by the Baker Reservoir Company. Public access is unrestricted. The impoundment, an earth-fill dam, was built in 1950. Reservoir water is consumed for irrigation, coldwater aquatic habitat and recreation. No changes in water use are planned, but St. George is undergoing a growth phase and is in need of more culinary water. Buying out agricultural interests at Baker Dam is a logical choice for St. George to look at to satisfy increasing culinary demand. The other options, implementing a conservation program or building new reservoirs, would not affect water use at Baker Dam.

Location

County	Washington
Longitude / Latitude	113 38 06 / 37 22 38
USGS Map	Central West, Utah, 1972
DeLorme's Utah Atlas and Gazetteer™	pg.46,B2
Cataloging Unit	Upper Virgin (15010008)

Recreation

Baker Dam Reservoir is accessible from the U-18 portion of the Legacy Loop Highway between St. George

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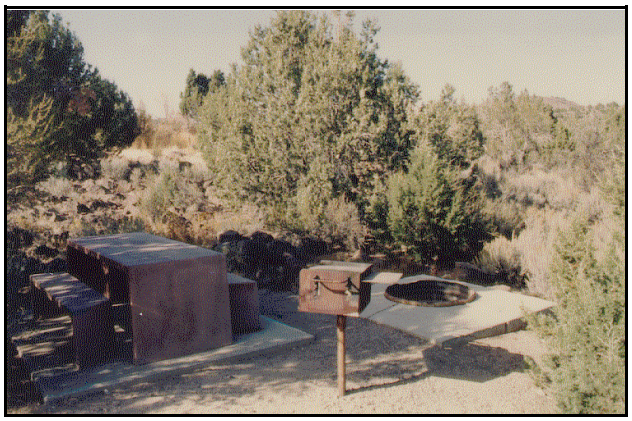
and Enterprise. It is four miles north of Veyo and two miles south of Central. There is an unpaved access road from U-18 that leads east to the reservoir.

Fishing and camping are the primary recreational uses of the area. The BLM's Baker Reservoir campground is adjacent to the reservoir, and has 10 campsites with picnic areas, vault toilets, drinking water, but no boatramp. Usage fees are charged. Cabins and meals may be available in the vicinity.



Watershed Description

Baker Dam Reservoir is the uppermost of the three major reservoirs on the Santa Clara River. It is located in a broad basin between the Pine Valley Mountains to the east and the Bull Valley Mountains to the west. The headwaters are on the northern slope of the Pine Valley Mountains, a federally protected wilderness area. Various tributaries flow down from the mountains into Pine Valley to form the Santa Clara River. There is a transbasin diversion of the upper Grass Creek watershed through a tunnel into North Fork Pinto Creek to Newcastle Reservoir. The Santa Clara River drops into lower elevations with drier climates, where it is impounded at Baker Dam for irrigational usage.

The watershed high point, Signal Peak, is 3,159 m (10,365 ft) above sea level, thereby developing a complex slope of 11.7% to the reservoir. The inflow and outflow is the Santa Clara River. The average stream gradient above the reservoir is 7.2% (379 feet per mile). Pine Valley Reservoir (New Castle Reservoir on some maps) is the sole upstream impoundment.

The watershed is made up of high mountains, mesas, alluvial fans, and floodplains. The soil associations that compose the watershed are found in Appendix III.

The vegetation communities are comprised of sage-grass, pinyon-juniper, bitterbrush-mountain mahogany, pine, aspen, spruce-fir, oak, and maple. The watershed receives 30 - 64 cm (12 - 25 inches) of precipitation annually with a frost-free season of 140 - 160 days at the reservoir.

Land use is multiple use (95%), pasture (5%), and urban (<1%). The major use of the watershed is for livestock grazing.

Limnological Assessment

The water quality of Baker Dam Reservoir is good. It is considered moderately hard to hard with hardness values ranging from 85 (1992) to 214 mg/L (1991). It appears that the hardness tends to increase during drought conditions due to high evaporation and a low inflow of higher quality water. Water quality constituents that have exceeded water quality standards for defined beneficial uses of the reservoir include: phosphorus; pH; dissolved oxygen; and temperature. Although the concentrations of phosphorus in the reservoir exceed the recommended allowances for phosphorus the concentration of nitrogen are usually low approaching the minimum detectable limits much of the time for ammonia and nitrate. The reservoir has a moderate to high biological productivity rate. A review of the data indicates that the reservoir is consistently nitrogen limited.

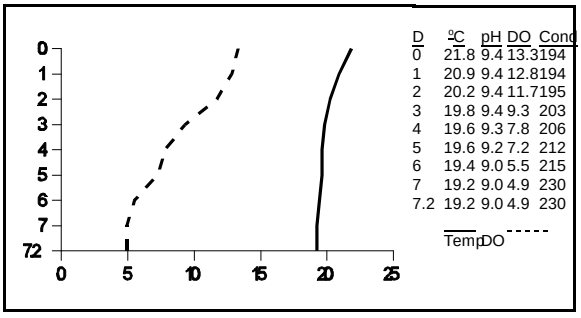
Limnological Data

Data averaged from STORET sites: 595054, 595055

Surface Data	1981	1990	1992
Trophic Status	M	H	E
Chlorophyll TSI	-	78.41	52.94
Secchi Depth TSI	36.72	49.92	48.98
Phosphorous TSI	59.57	70.47	49.35
Average TSI	48.13	66.26	50.42
Chlorophyll a (ug/L)	-	130.8	10.123
Transparency (m)	-	1.8	2.15
Total Phosphorous (ug/L)	45	236	23
pH	8.1	9	9.1
Total Susp. Solids (mg/L)	5	9.3	<3
Total Volatile Solids (mg/L)	-	-	2
Total Residual Solids (mg/L)	-	-	2
Temperature (°C / °f)	17/63	21/70	20/67
Conductivity (umhos.cm)	251	404	174
Water Column Data			
Ammonia (mg/L)	0.05	0.04	0.03
Nitrate/Nitrite (mg/L)	0.05	-	0.03
Hardness (mg/L)	109	214	79
Alkalinity (mg/L)	108	199	83
Silica (mg/L)	-	-	26.5
Total Phosphorous (ug/L)	45	243	41
Miscellaneous Data			
Limiting Nutrient	N	N	N
DO (Mg/l) at 75% depth	7.4	15	6.5
Stratification (m)	6-7	NO	NO
Depth at Deepest Site (m)	8	1.5	7.2

The trophic status of the reservoir ranges from the upper ranges of mesotrophic to hypereutrophic. The reservoir productivity does appear to increase during drought

conditions when the reservoir volume is diminished. The only stratification that was documented in the reservoir was in June, 1981 between 6 and 7 meters. Although no thermocline was present on September 9, 1992 there was a fairly rapid loss of dissolved oxygen (13.3 to 4.9 mg/L) in the water column. The water temperature through out the water column either exceeds or borders near the maximum allowable value (20 degrees C) for a cold water fishery. It appears that one of the major criteria the affects water quality is the quantity of water stored in the reservoir. According to DWR stocking reports Baker Dam Reservoir is stocked annually with catchable rainbow (*Oncorhynchus mykiss*) and on occasion brown trout (*Salmo trutta*). Other non-game species reported include the redside shiner (*Richardsonius balteatus* hydrophlox), mountain sucker (*Catostomus platyrhynchus*), and green sunfish (*Lepomis cyanellus*). The reservoir was chemically treated in 1959 and 1982 to control rough fish competition, therefore populations of native fish may not be present in the system. In addition an abundant population of crayfish is present. As reported by DWQ (1982) invertebrates were sparse; mostly snails and annelids. Also reported were two types of algae (*Lyngbya aerugineo-caerulea*) and (*Sphaerocystis schroeteri*), and an abundant population of copepods present. In addition it has been reported that a heavy proliferation of macrophytes develop in late summer.



D	°C	pH	DO	Cond
0	21.8	9.4	13.3	194
1	20.9	9.4	12.8	194
2	20.2	9.4	11.7	195
3	19.8	9.4	9.3	203
4	19.6	9.3	7.8	206
5	19.6	9.2	7.2	212
6	19.4	9.0	5.5	215
7	19.2	9.0	4.9	230
7.2	19.2	9.0	4.9	230

Phytoplankton in the euphotic zone include the following taxa (in order of dominance):

Species	Cell Volume (mm^3/liter)	% Density By Volume
Aphanizomenon flos-aquae	102.471	96.79
Sphaerocystis schroeteri	2.641	2.49
Pediastrum duplex	0.722	0.68
Pennate diatoms	0.022	0.02
Ankistrodesmus falcatus	0.009	0.01
Total	105.864	
Shannon-Weaver [H']	0.16	
Species Evenness	0.10	
Species Richness	0.16	

It appears that the algal community is dominated by *Aphanizomenon flos-aquae* a blue-green species indicative of eutrophic waters.

Information

Management Agencies	
Bureau of Land Management	539-4001
Dixie Resource Area (St. George)	673-4654
Five County Association of Governments	673-3548
Division of Wildlife Resources	586-2455
Division of Water Quality	538-6146
Recreation	
Color Country Travel Region (St. George)	628-4171
Reservoir Administrators	
Washington County Water Conservation District	673-3617
Baker Dam Reservoir Company	673-2893

Pollution Assessment

Nonpoint pollution sources are: sedimentation and nutrient loading from grazing and feed yards, household wastes from urban areas, and litter, toxins, and other human wastes from recreation. Cattle graze in the watershed and around the reservoir.

There are no point pollution sources in the watershed.

Beneficial Use Classification

The state beneficial use classifications include: boating and similar recreation (excluding swimming) (2B), cold water game fish and organisms in their food chain (3A) and agricultural uses (4).

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